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10/034,379	01/03/2002	Yoshirou Tsurugida	OKI.291	8667

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EXAMINER

NHU, DAVID

ART UNIT PAPER NUMBER

2818

DATE MAILED: 01/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/034,379

Applicant(s)

TSURUGIDA, YOSHIROU

Examiner

David Nhu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 7 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTIONS

Claims 1-7 are present for examination.

#### ***Specifications***

1. Page 4, line 6, "Fig. 1" should be – Fig. 1A-1E --

Also Page 5, line 6, "Fig. 1" should be – Fig. 1A-1E --

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-4, 6-7 are rejected under U.S.C 103(a) as being unpatentable over Mathews (5,837,378) in view of Halliyal et al (6,319, 775 B1), and Numasawa (5,306,672), Background of Invention (BOI).

**Regarding claim 1**, Mathews, figures 1-4, and related text on col. 1-10, (figure 2A-2F, col. 4, lines 63-67, col. 5, lines 1-67, col. 6, lines 1-62), disclose a method of forming selectively oxidizing a silicon wafer comprises the steps of: covering each of whole areas of both surfaces of a silicon wafer 150 by an oxidation inhibitor film (silicon nitride film) 154a, 154b with interposition of a pad oxide film 151a, 151b; patterning said pad oxide film and an oxidation inhibitor film on said pad oxide film on one surface of said wafer to form desired patterns to partially expose the one surface of said wafer through said patterns; removing said pad oxide film and said oxidation inhibitor film on said pad oxide film formed on the other surface of said wafer to expose the whole area of the other surface of said wafer; oxidizing the regions

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exposed partially on the one surface of said wafer and the whole area of the other surface of said wafer simultaneously to grow a silicon dioxide film on both surfaces of said wafer.

It is noted that Mathews fails to teach the step of removing said oxidation inhibitor film overlying said pad oxide film and said underneath pad oxide film remaining on the one surface of said wafer.

However, Halliyal, figures 1-4, and related on col. 1-8, (figures 3, 4, col. 5, lines 12-67, col. 6, lines 1-16), teach removing said oxidation inhibitor film (silicon nitride film) 30 overlying said pad oxide film 28 and said underneath pad oxide film remaining on the one surface of said wafer.

Also, Numasawa, figures 1-3, (col. 5, lines 63-67, col. 6, lines 24-35) teach removing said oxidation inhibitor film (silicon nitride film) overlying said pad oxide film and said underneath pad oxide film remaining on the one surface of said wafer.

Regarding claim 2, (BOI, pages 1-2) teaches the oxidation inhibitor film is a silicon nitride film.

Regarding claim 3, (Halliyal, col. 5, lines 1-8, col. 6, lines 6-16) teaches the pad oxide film covering both surfaces of said wafer are formed in a batch-type thermal oxidation furnace/apparatus.

Regarding claim 4, (Halliyal, col. 6, lines 6-16) teaches the silicon nitride films covering both surfaces of said wafer with interposition of said pad oxide film are formed by a batch-type LPCVD.

Regarding claim 6, (BOI, col. 5, pages 1-2) teaches the oxide film partially formed on the one surface of said wafer is used isolation regions.

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Regarding claims 7, (BOI, pages 1-2) teaches the oxide film formed on the whole area of the other surface of said wafer is used as a sacrifice layer to remove contamination, which occurs in handling of said wafer, by an etching process.

It would have been obvious to one having ordinary skill in the art at the time of the present invention to apply the teachings of Halliyal, Numasawa and BOI into the method of Mathews as they are related to the same subject matter of carrying out a LOCOS process effectively, a number of silicon wafers are held standing up on either edges or lying horizontal mutually spaced apart on a holder called a wafer boat and are transferred into an oxidation process which can be carried out in either a batch-type thermal oxidation furnace, or alternatively, in a single wafer oxidation apparatus.

***Allowable Subject Matter***

4. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 5 includes allowable subject matter since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations.

Because Mathews, BOI, Numasawa, and Halliyal taken individually or in combination, do not teach exposed regions on the one surface of said wafer and the exposed area on the other surface of said wafer are subjected to said oxidation process by a batch-type thermal oxidation furnace.

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### Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Park'227, Komori'730, Wada'072 are cited as of interest.
6. A shortened statutory period for response to this action is set to expired 3 (three) months from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see 710.02 (b)).
7. Any inquiry concerning this communication on earlier communications from the examiner should be directed to David Nhu, (703) 306- 5796. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM. The examiner's supervisor, David Nelms can be reached on (703) 308-4910.

*The fax phone number for the organization where this application or proceeding is assigned is (703) 308-872-9306.*

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956

David Nhu



December 22, 2003